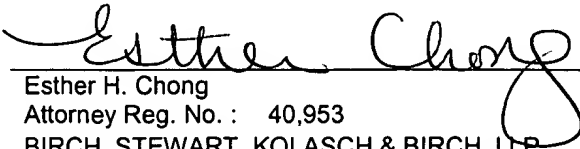




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TRANSMITTAL OF APPEAL BRIEF			Docket No. 3430-0149P
In re Application of: Jeong-Jin KIM et al.			
Application No. 09/727,516-Conf. #5548	Filing Date December 4, 2000	Examiner A. K. Alanko	Group Art Unit 1765
Invention: APPARATUS FOR AND METHOD OF ETCHING AND CLEANING OBJECTS			
<p style="text-align: center;"><b><u>TO THE COMMISSIONER OF PATENTS:</u></b></p> <p>Transmitted herewith is the Appeal Brief in this application, with respect to the Notice of Appeal filed: <u>November 20, 2006</u> .</p> <p>The fee for filing this Appeal Brief is <u>\$ 500.00</u> .</p> <p><input checked="" type="checkbox"/> Large Entity      <input type="checkbox"/> Small Entity</p> <p><input type="checkbox"/> A petition for extension of time is also enclosed.</p> <p>The fee for the extension of time is _____ .</p> <p><input checked="" type="checkbox"/> A check in the amount of <u>\$ 500.00</u> is enclosed.</p> <p><input type="checkbox"/> Charge the amount of the fee to Deposit Account No. <u>02-2448</u> . This sheet is submitted in duplicate.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input checked="" type="checkbox"/> The Director is hereby authorized to charge any additional fees that may be required or credit any overpayment to Deposit Account No. <u>02-2448</u> . This sheet is submitted in duplicate.</p> <p> _____ Esther H. Chong Attorney Reg. No. : 40,953 BIRCH, STEWART, KOLASCH &amp; BIRCH, LLP 8110 Gatehouse Road Suite 100 East P.O. Box 747 Falls Church, Virginia 22040-0747 (703) 205-8000</p> <p>Dated: <u>January 22, 2007</u></p>			



Docket No.: 3430-0149P  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:  
Jeong-Jin KIM et al.

Before the Board of Appeals

Application No.: 09/727,516

Confirmation No.: 5548

Filed: December 4, 2000

Art Unit: 1765

For: APPARATUS FOR AND METHOD OF  
ETCHING AND CLEANING OBJECTS

Examiner: A. K. Alanko

**APPEAL BRIEF ON BEHALF OF APPELLANTS UNDER**  
**37 C.F.R. § 41.37**

**MS APPEAL BRIEF - PATENTS**

Docket No.: 3430-0149P  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re Patent Application of:  
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For: APPARATUS FOR AND METHOD OF  
ETCHING AND CLEANING OBJECTS

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Examiner: A. K. Alanko

**APPEAL BRIEF ON BEHALF OF APPELLANT**  
**UNDER 37 C.F.R. § 41.37**

**MS APPEAL BRIEF - PATENTS**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This is an Appeal from the Office Action of August 23, 2006 finally rejecting claims 4-20 in the above-identified application. The appealed claims are 4-20, and are set forth in the attached Appendix.

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Application No. 09/727,516  
Atty. Docket No: 3430-0149P  
Brief On Behalf of Appellants

**L. REAL PARTY IN INTEREST**

The instant application is assigned to LG.PHILIPS LCD CO., LTD. as recorded on March 19, 2001, at Reel/Frame 011604/0899. No further assignments of this application have been made.



Application No. 09/727,516  
Atty. Docket No: 3430-0149P  
Brief On Behalf of Appellants

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**II. RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences for the instant application.

Application No. 09/727,516  
Atty. Docket No: 3430-0149P  
Brief On Behalf of Appellants

### **III. STATUS OF THE CLAIMS**

Claims 4-20 are finally rejected and are set forth in the attached Appendix.

#### **IV. STATUS OF AMENDMENTS**

A Response to Restriction Requirement has been filed on January 28, 2003 to elect claims 4-11 (Group II).

An Amendment has been filed on May 12, 2004 to cancel claims 1-3 and amend claims 4, 5 and 9-11 to respond to the Office Action of February 12, 2004.

An Amendment has been filed on January 21, 2005 to amend claim 4 to respond to the final Office Action of September 21, 2004.

An Amendment has been filed on July 25, 2005 to amend claim 4 to respond to the Office Action of March 24, 2005.

A Request for Reconsideration has been filed on January 5, 2006 to respond to the final Office Action of October 5, 2005. However, no amendment has been made in the January 5 Request for Reconsideration.

An Amendment has been filed on February 6, 2006 to add claims 12-20 to respond to the final Office Action of October 5, 2005.

A Request for Reconsideration has been filed on June 1, 2006 to respond to the Office Action of March 1, 2006. However, no amendment has been made in the June 1 Request for Reconsideration.



**V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

***Claims 4-12***

Independent claim 4 and its dependent claims relate to a method of etching and cleaning objects (e.g., 12 in FIG. 3) contained in a vessel (e.g., 10 in FIG. 3), comprising the steps of: introducing an etching solution into the vessel from below the objects (e.g., from the second supplying pipe 10b in Fig. 3), as discussed, e.g., in FIG. 3 and on page 6, lines 4-6 of the specification as originally filed; etching the objects with the etching solution, as discussed, e.g., in FIG. 3 and on page 6, lines 7-8 of the specification; introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects (e.g., from the first supplying pipe 10a), as discussed, e.g., in FIG. 3 and on page 6, lines 9-14 of the specification as originally filed; cleaning the objects by introducing a cleaning solution into the vessel from below the objects (e.g., from the third supplying pipe 10c), as discussed, e.g., in FIG. 3 and on page 6, lines 15-16 of the specification; and draining the cleaning solution from the vessel from above the objects (e.g., from the first draining pipe 10d), as discussed, e.g., in FIG. 3 and on page 6, lines 16-17 of the specification.

***Claims 13-20***

Independent claim 13 and its dependent claims relate to a method of etching and cleaning objects (e.g., 12 in FIG. 3) contained in a vessel (e.g., 10 in FIG. 3), comprising the steps of: etching the objects with an etching solution in the vessel, as discussed, e.g., in FIG. 3 and on page 6, lines 7-8 of the specification; forcing the etching solution out of the vessel from below

the objects by introducing a pressurized gas into the vessel from above the objects (e.g., from the first supplying pipe 10a), as discussed, e.g., in FIG. 3 and on page 6, lines 9-14 of the specification; after the etching solution is forced out by the pressurized gas, cleaning the objects by introducing a cleaning solution into the vessel from below the objects (e.g., from the third supplying pipe 10c), as discussed, e.g., in FIG. 3 and on page 6, lines 15-16 of the specification; and draining the cleaning solution from the vessel from above the objects (e.g., from the first draining pipe 10d), as discussed, e.g., in FIG. 3 and on page 6, lines 16-17 of the specification.

**VI. GROUNDS OF REJECTION**

Claims 4-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the Applicants' Related Art disclosure, in view of Yates, U.S. Patent No. 6,350,322.

## **VII. APPELLANTS' ARGUMENTS**

### **1. Rejection under 35 U.S.C. §103(a) over the Appellants' Related Art disclosure, in view of Yates, U.S. Patent No. 6,350,322**

#### ***Claims 4-12***

Independent claim 4 recites, inter alia, “introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects”; “cleaning the objects by introducing a cleaning solution into the vessel from below the objects” and “draining the cleaning solution from the vessel from above the objects.”

The Examiner alleged that the Applicants' Related Art disclosure in FIG. 1 discloses each and every step of claim 4 except for “introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects” as recited in claim 4. To address this deficiency, the Examiner turned to Yates.

The Examiner has correctly acknowledged that Yates fails to teach draining etchant from the wet etching chamber by introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects as recited in claim 4 (see Office Action, the paragraph bridging pages 4 and 5). However, the Examiner took the position that since Yates discloses draining the cleaning solution (DI water) from the gas etch chamber by displacing the DI water bath with a gas or a vapor from an effluent valve in the gas etch chamber below the semiconductor structure, it is obvious for one skilled in the art to drain Applicants' related art's wet

etchant using Yates' method of draining the DI water. Appellants respectfully disagree with the Examiner's position and present the arguments hereinbelow.

In particular, the Examiner correctly acknowledged that there is no description in Yates of how a wet etchant would be drained from the vessel. However, the Examiner relied on claim 23 of Yates, which recites "performing a chemical reaction wet etching upon said semiconductor structure within a single compartment of an at least substantially enclosed vessel" and "purging the single compartment of said vessel with a gas". Although Yates discloses that the inert gas is purged into the vessel, Yates discloses that the inert gas is used to avoid oxidation or other contamination incident to ambient air exposure that may occur *during and after rising* (see col. 5, lines 4-8). Thus, Yates nowhere discloses using the gas to drain the wet etchant. Instead, Yates discloses that following the chemical treatment step (in which the aqueous HF is *discarded*; see col. 5, lines 26-28), a rinsing step is carried out by performing a DI water rinse in a treatment vessel (see col. 5, lines 30-33), and that the treatment vessel is flooded with an inert gas to create an inert atmosphere that is maintained during rising to avoid the unwanted oxidation (col. 5, lines 61-65). Therefore, it is clear that the inert gas is purged into the treatment vessel after the aqueous HF is *discarded*, and is not used to drain the aqueous HF.

In addition, as mentioned, the Examiner took the position that since Yates discloses draining the cleaning solution (DI water) from the gas etch chamber by displacing the DI water bath with a gas or a vapor from an effluent valve in the gas etch chamber below the semiconductor structure, it is obvious for one skilled in the art to drain the wet etchant using the same method as draining the DI water (see Office Action, page 4, lines 9-2; page 5, lines 8-13). This conclusion is

improper because the Examiner completely fails to provide any objective evidence supporting her allegation.

The mere fact that the prior art (related art) may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be suggested or taught by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1970). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Moreover, a showing of a suggestion, teaching, or motivation to combine the prior art references is an “essential evidentiary component of an obviousness holding.” C.R. Bard, Inc. v. M3 Sys. Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998). This showing must be clear and particular, and broad conclusory statements about the teaching of multiple references, standing alone, are not “evidence.” See In re Dembiczak, 175 F.3d 994 at 1000, 50 USPQ2d 1614 at 1617 (Fed. Cir. 1999).

To be proper, there must be actual evidence of a suggestion or motivation to modify a reference and the showing must be clear and particular. In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) abrogated on other grounds, in In re Gartside, 203 F.3d 1305, 53 USPQ2d 1769 (Fed. Cir. 2000); see also, Smith Indus. Med. Sys. v. Vital Signs, Inc., 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1421 (Fed. Cir. 1999) (“That knowledge *may* have been

within the province of the ordinary artisan does not in and of itself make it so, absent clear and convincing evidence of t knowledge.”) (emphasis in original); *see In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Moreover, a factual inquiry whether to modify a reference must be based on objective evidence of record, not merely conclusory statements of the Examiner. *See, In re Lee*, 277 F.3d 1338, 1343, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002).

Here, Yates merely focuses on the DI water rinsing process after the chemical treatment and does not discuss how the wet etching treatment or draining process is performed. In particular, Yates in col. 6, lines 26-30 discloses that the chemical treatment, such as wet or dry etching, may be carried out and *following the chemical treatment, a DI water rinse followed by drying is carried out*. Yates in FIGs. 5 and 6 and col. 8, lines 6-48 also discloses that *after the chemical treatment*, the DI water flows from the bottom (FIG. 5) or the side (FIG. 6) of the rinser 40/42 and overflows out of the rinser 40/42 at the right exit. However, Yates nowhere teaches how the *etching solution* is drained out of the rinser 40/42, and therefore fails to teach “introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects” as recited in claim 4.

In addition, the Examiner *admitted* that Yates fails to teach draining the etchant from the wet etching chamber by introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects as recited in claim 4 (see Office Action, page 4, lines 8-9 and 19-20; page 5, line 1). The Examiner then made the statement that *since this feature is not disclosed by Yates*, it is *expected* that it would be drained in the same

manner as the cleaning solution. Again, the Examiner simply made a conclusory statement without providing any reference to support her obviousness position and simply made unsupported assumptions which are not taught in Yates. Such hindsight reconstruction is not permissible. If the Examiner persists in her position, the Examiner has the obligation to provide the reference(s) to teach this feature, which the Examiner has not provided.

In the alternative, even if, assuming *arguendo*, Yates disclosed draining the etchant from the wet etching chamber by introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects as recited in claim 4, modifying the Applicants' Related Art disclosure in FIG. 1 with Yates' teaching would still fail to teach "draining the cleaning solution from the vessel from above the objects" as recited in claim 4.

In particular, the Applicants' Related Art disclosure in FIG. 1 discloses supplying the DI water from below the objects to push the mixture of the etching solution and the DI water out of the vessel from above the objects via 10d. The purpose of this step is to use the DI water to drain the etching solution out of the vessel. However, by replacing this step with Yates' teaching based on the Examiner's position, it would be *no longer necessary to use the DI water to drain the etching solution out of the vessel* from above the objects because the etching solution has already been drained out of vessel by the introduced gas. In other words, by replacing this step with Yates' teaching as suggested by the Examiner, there would be *no need to drain the DI water from above the objects*. Instead, the DI water will be drained from *below* the objects, as described in paragraph [0008] of the specification.



The Examiner on page 7, lines 10-11 of the Office Action of August 23, 2006 alleged “there can be numerous ways to drain, and they do not negate previous ways to drain.” Appellants respectfully disagree. In particular, a time period for a solution such as an etchant and a cleaning solution to stay in a vessel is determined by inlet and outlet directions of the solution, and an etch uniformity is determined by the time period. Accordingly, the inlet and outlet directions of the solution are important factors for a process and are not obvious.

In addition, as mentioned, the Examiner also took the position that the etching solution and the DI water of Yates should be drained *in the same manner, i.e., from below* the objects (see Office Action, page 4, lines 10-13). Therefore, the Examiner’s position makes it more evident that, by modifying the Applicants’ Related Art disclosure with Yates’ teaching, the DI water will be drained out of the vessel from *below* the objects (and not “from above the objects” as required by claim 4). Accordingly, the combination of the Applicants’ Related Art disclosure and Yates fails to teach “draining the cleaning solution from the vessel from above the objects” as recited in claim 4.

The Examiner on page 7, lines 14-16 of the Office Action of August 23, 2006 alleged “the chamber would have to be redesigned if the drainage were to occur in a different manner, so they are expected to drain in similar manners.” Again, Appellants respectfully disagree. In particular, two vessels could have different inlet and outlet directions of the solution such that positions of inlet and outlet pipes are different from each other. In addition, the Examiner’s allegation is simply based on the Examiner’s own opinion without providing any reference to support her allegation and is simply unsupported assumptions which are not taught in Yates.

Accordingly, neither the Applicants' Related Art disclosure nor Yates individually or in combination teaches or suggests the above-noted features of independent claim 4. Therefore, Appellants respectfully submit that independent claim 4 and its dependent claims (due to their dependency) clearly define over the teachings of the Applicants' Related Art disclosure and Yates.

*Claims 13-20*

Independent claim 13 recites “forcing the etching solution out of the vessel from below the objects by introducing a pressurized gas into the vessel from above the objects”; “after the etching solution is forced out by the pressurized gas, cleaning the objects by introducing a cleaning solution into the vessel from below the objects” and “draining the cleaning solution from the vessel from above the objects.”

The Examiner alleged that the Applicants' Related Art disclosure in FIG. 1 discloses each and every step of claim 13 except for “forcing the etching solution out of the vessel from below the objects by introducing a pressurized gas into the vessel from above the objects” as recited in claim 13.

The Examiner has correctly acknowledged that Yates fails to teach draining the etchant from the wet etching chamber by introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects as recited in claim 13 (see Office Action, the paragraph bridging pages 4 and 5). However, the Examiner took the position that since Yates discloses draining the cleaning solution (DI water) from the gas etch

chamber by displacing the DI water bath with a gas or a vapor from an effluent valve in the gas etch chamber below the semiconductor structure, it is obvious for one skilled in the art to drain the wet etchant using the same method as draining the DI water. Appellants respectfully disagree with the Examiner's position and present the arguments hereinbelow.

In particular, the Examiner correctly acknowledged that there is no description in Yates of how a wet etchant would be drained from the vessel. However, the Examiner relied on claim 23 of Yates, which recites "performing a chemical reaction wet etching upon said semiconductor structure within a single compartment of an at least substantially enclosed vessel" and "purging the single compartment of said vessel with a gas". Although Yates discloses that the inert gas is purged into the vessel, Yates discloses that the inert gas is used to avoid oxidation or other contamination incident to ambient air exposure that may occur *during and after rising* (see col. 5, lines 4-8). However, Yates nowhere discloses using the gas to drain the wet etchant. Instead, Yates discloses that following the chemical treatment step (in which the aqueous HF is *discarded*; see col. 5, lines 26-28), a rinsing step is carried out by performing a DI water rinse in a treatment vessel (see col. 5, lines 30-33), and that the treatment vessel is flooded with an inert gas to create an inert atmosphere that is maintained during rising to avoid the unwanted oxidation (col. 5, lines 61-65). Therefore, it is clear that the inert gas is purged into the treatment vessel after the aqueous HF is *discarded*, and is not used to drain the aqueous HF.

In addition, as mentioned, the Examiner took the position that since Yates discloses draining the cleaning solution (DI water) from the gas etch chamber by displacing the DI water bath

with a gas or a vapor from an effluent valve in the gas etch chamber below the semiconductor structure, it is obvious for one skilled in the art to drain the wet etchant using the same method as draining the DI water (see Office Action, page 4, lines 9-2; page 5, lines 8-13). This conclusion is improper because the Examiner completely fails to provide any objective evidence supporting her allegation.

The mere fact that the prior art (related art) may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be suggested or taught by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1970). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Moreover, a showing of a suggestion, teaching, or motivation to combine the prior art references is an “essential evidentiary component of an obviousness holding.” C.R. Bard, Inc. v. M3 Sys. Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998). This showing must be clear and particular, and broad conclusory statements about the teaching of multiple references, standing alone, are not “evidence.” See In re Dembiczak, 175 F.3d 994 at 1000, 50 USPQ2d 1614 at 1617 (Fed. Cir. 1999).

To be proper, there must be actual evidence of a suggestion or motivation to modify a reference and the showing must be clear and particular. *In re Dembiczak*, 175 F.3d 994, 999, 50

USPQ2d 1614, 1617 (Fed. Cir. 1999) abrogated on other grounds, in *In re Gartside*, 203 F.3d 1305, 53 USPQ2d 1769 (Fed. Cir. 2000); see also, *Smith Indus. Med. Sys. v. Vital Signs, Inc.*, 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1421 (Fed. Cir. 1999) (“That knowledge *may* have been within the province of the ordinary artisan does not in and of itself make it so, absent clear and convincing evidence of t knowledge.”) (emphasis in original); see *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Moreover, a factual inquiry whether to modify a reference must be based on objective evidence of record, not merely conclusory statements of the Examiner. See, *In re Lee*, 277 F.3d 1338, 1343, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002).

Here, Yates merely focuses on the DI water rinsing process after the chemical treatment and does not discuss how the wet etching treatment or draining process is performed. In particular, Yates in col. 6, lines 26-30 discloses that the chemical treatment, such as wet or dry etching, may be carried out and *following the chemical treatment, a DI water rinse followed by drying is carried out*. Yates in FIGs. 5 and 6 and col. 8, lines 6-48 also discloses that *after the chemical treatment*, the DI water flows from the bottom (FIG. 5) or the side (FIG. 6) of the rinser 40/42 and overflows out of the rinser 40/42 at the right exit. However, Yates nowhere teaches how the *etching solution* is drained out of the rinser 40/42, and therefore fails to teach “forcing the etching solution out of the vessel from below the objects by introducing a pressurized gas into the vessel from above the objects” as recited claim 13.

In addition, the Examiner *admitted* that Yates fails to teach draining etchant from the wet etching chamber by introducing a pressurized gas into the vessel from above the objects to force the

etching solution out of the vessel from below the objects as recited in claim 13 (see Office Action, page 4, lines 8-9 and 19-20; page 5, line 1). The Examiner made the statement that *since this feature is not disclosed by Yates*, it is *expected* that it would be drained in the same manner as the cleaning solution. Again, the Examiner simply made a conclusory statement without providing any reference to support her obviousness position and simply made unsupported assumptions which are not taught in Yates. Such hindsight reconstruction is not permissible. If the Examiner persists in her position, the Examiner has the obligation to provide the reference(s) to teach this feature, which the Examiner has not provided.

In the alternative, even if, assuming *arguendo*, Yates disclosed draining the etchant from the wet etching chamber by introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects as recited in claim 13, modifying the Applicants' Related Art disclosure in FIG. 1 with Yates' teaching would still fail to teach "draining the cleaning solution from the vessel from above the objects" as recited in claim 13.

In particular, the Applicants' Related Art disclosure in FIG. 1 discloses supplying the DI water from below the objects to push the mixture of the etching solution and the DI water out of the vessel from above the objects via 10d. The purpose of this step is to use DI water to drain the etching solution out of the vessel. However, by replacing this step with Yates' teaching based on the Examiner's position, it would be *no longer necessary to use the DI water to drain the etching solution out of the vessel* from above the objects because the etching solution has already been drained out of vessel by the introduced gas. In other words, by replacing this step with Yates' teaching as alleged by the Examiner, there would be *no need to drain the DI water from above the*

*objects*. Instead, the DI water will be drained from *below* the objects, as described in paragraph [0008] of the specification.

The Examiner on page 7, lines 10-11 of the Office Action of August 23, 2006 alleged “there can be numerous ways to drain, and they do not negate previous ways to drain.” Appellants respectfully disagree. In particular, a time period for a solution such as an etchant and a cleaning solution to stay in a vessel is determined by inlet and outlet directions of the solution, and an etch uniformity is determined by the time period. Accordingly, the inlet and outlet directions of the solution are important factors for a process and are not obvious.

In addition, as mentioned, the Examiner also took the position that the etching solution and the DI water of Yates should be drained *in the same manner, i.e., from below* the objects (see Office Action, page 4, lines 10-13). Therefore, the Examiner’s position makes it more evident that, by modifying the Applicants’ Related Art disclosure with Yates’ teaching, the DI water will be drained out of the vessel from *below* (not above) the objects. Accordingly, the combination of the Applicants’ Related Art disclosure and Yates fails to teach “draining the cleaning solution from the vessel from above the objects” as recited in claim 13.

The Examiner on page 7, lines 14-16 of the office action of August 23, 2006 alleged “the chamber would have to be redesigned if the drainage were to occur in a different manner, so they are expected to drain in similar manners.” Again, Appellants respectfully disagree. In particular, two vessels could have different inlet and outlet directions of the solution such that positions of inlet and outlet pipes are different from each other. In addition, the Examiner’s allegation is

simply based on the Examiner's own opinion without providing any reference to support her allegation and is simply unsupported assumptions which are not taught in Yates.

Accordingly, neither the Applicants' Related Art disclosure nor Yates individually or in combination teaches or suggests the above-noted features of independent claim 13. Therefore, Appellants respectfully submit that independent claim 13 and its dependent claims (due to their dependency) clearly define over the teachings of the Applicants' Related Art disclosure and Yates.

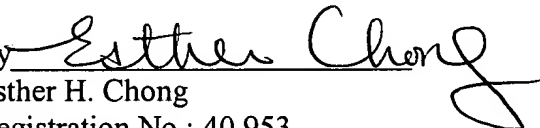
In summary, it is believed that independent claims 4 and 13, as well as the dependent claims are neither suggested nor rendered obvious by the prior art utilized by the Examiner. It is believed that the Appellants have countered all the reasons given for the rejections of the appealed claims, and thus these rejections do not appear to be proper. Accordingly, it is respectfully requested that this Board reverse the final rejection of claims 4-20.



If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Dated: January 22, 2007

Respectfully submitted,

By   
Esther H. Chong  
Registration No.: 40,953  
BIRCH, STEWART, KOLASCH & BIRCH, LLP  
8110 Gatehouse Road  
Suite 100 East  
P.O. Box 747  
Falls Church, Virginia 22040-0747  
(703) 205-8000  
Attorney for Appellants



Attachments: Claims Appendix  
Evidence Appendix  
Related Proceedings Appendix

**VIII. CLAIMS APPENDIX**

1-3. (Cancelled)

4. (Previously Presented) A method of etching and cleaning objects contained in a vessel, comprising the steps of:

introducing an etching solution into the vessel from below the objects;

etching the objects with the etching solution;

introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects;

cleaning the objects by introducing a cleaning solution into the vessel from below the objects; and

draining the cleaning solution from the vessel from above the objects.

5. (Previously Presented) The method of claim 4, wherein the sequential steps of forcing out the etching solution alone and draining the cleaning solution are carried out through different draining pipes connected to the vessel.

6. (Original) The method of claim 4, wherein the pressurized gas is nitrogen gas.

7. (Original) The method of claim 4, wherein the etching solution is Oxalic acid solution or diluted Oxalic acid solution.

8. (Original) The method of claim 4, wherein the cleaning solution is deionized water.

9. (Previously Presented) The method of claim 4, wherein the step of forcing out the etching solution is enhanced by pumping the etching solution out of the vessel.

10. (Previously Presented) The method of claim 4, further comprising:  
drying the objects by providing drying gas into the vessel after draining the cleaning solution.

11. (Previously Presented) The method of claim 10, wherein the drying gas includes isopropyl alcohol.

12. (Previously Presented) The method of claim 4, wherein the step of cleaning the objects by introducing the cleaning solution into the vessel from below the objects is performed after the step of introducing the pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects.

13. (Previously Presented) A method of etching and cleaning objects contained in a vessel, comprising the steps of:  
etching the objects with an etching solution in the vessel;

forcing the etching solution out of the vessel from below the objects by introducing a pressurized gas into the vessel from above the objects;

after the etching solution is forced out by the pressurized gas, cleaning the objects by introducing a cleaning solution into the vessel from below the objects; and

draining the cleaning solution from the vessel from above the objects.

14. (Previously Presented) The method of claim 13, wherein the sequential steps of forcing out the etching solution alone and draining the cleaning solution are carried out through different draining pipes connected to the vessel.

15. (Previously Presented) The method of claim 13, wherein the pressurized gas is nitrogen gas.

16. (Previously Presented) The method of claim 13, wherein the etching solution is Oxalic acid solution or diluted Oxalic acid solution.

17. (Previously Presented) The method of claim 13, wherein the cleaning solution is deionized water.

18. (Previously Presented) The method of claim 13, wherein the step of forcing out the etching solution is enhanced by pumping the etching solution out of the vessel.

19. (Previously Presented) The method of claim 13, further comprising:  
drying the objects by providing drying gas into the vessel after draining the cleaning  
solution.

20. (Previously Presented) The method of claim 19, wherein the drying gas includes  
isopropyl alcohol.

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**IX. EVIDENCE APPENDIX**

None

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**X. RELATED PROCEEDINGS APPENDIX**

None